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S.N. 356,740 Gro Art Unit 315

343,806 COMPLETE SPECIFICATION

[This Drawing is a reproduction of the Original on a reduced scale]

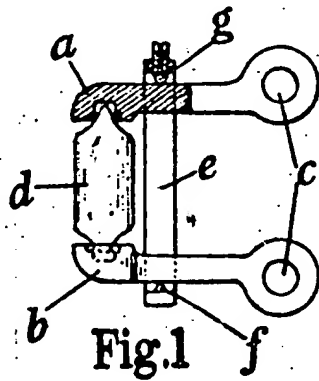


Fig. 1

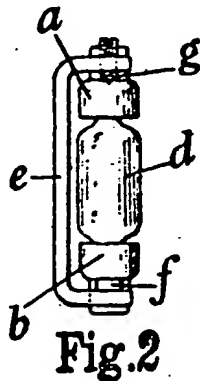


Fig. 2

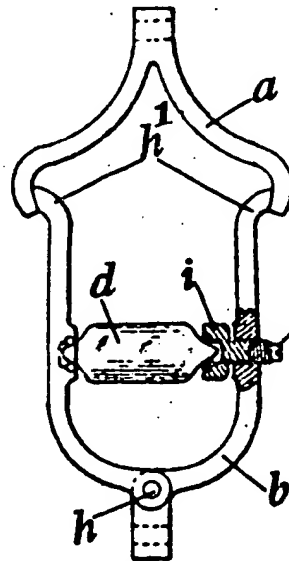


Fig. 3

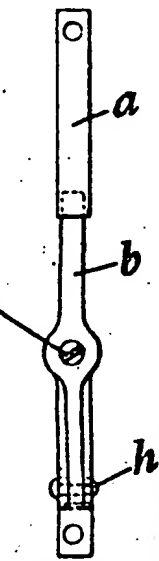


Fig. 4

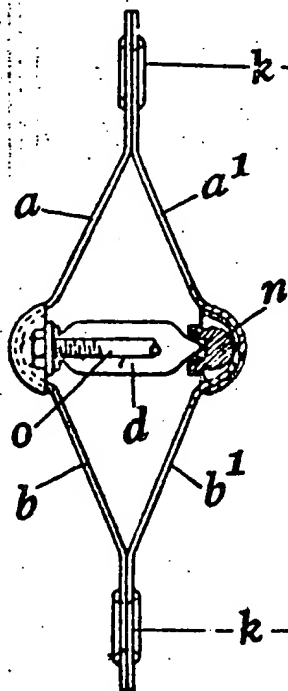


Fig. 5

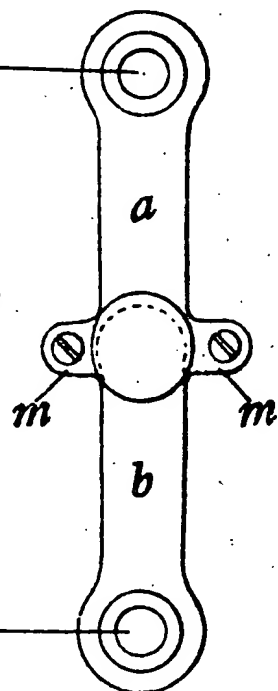


Fig. 6

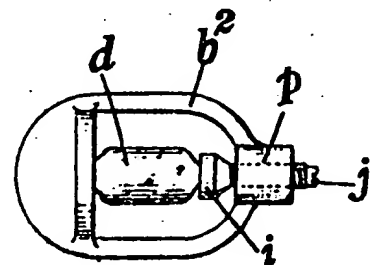


Fig. 7

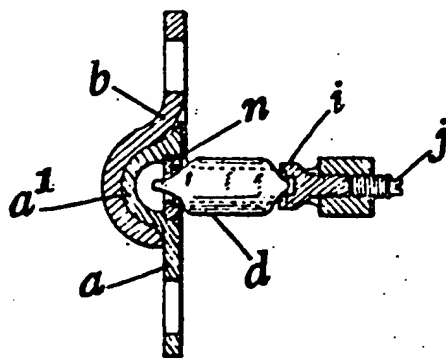


Fig. 8

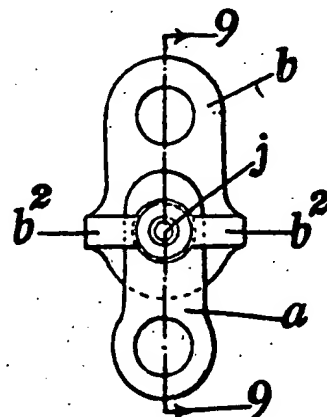


Fig. 9

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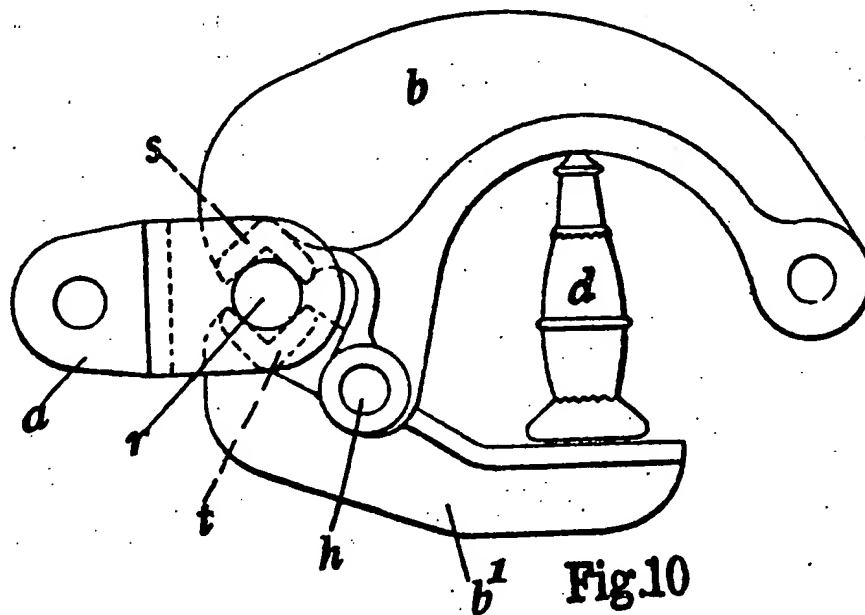


Fig 10

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Pat 46
Feb 1931

PATENT SPECIFICATION

Application Date: April 9, 1930. No. 11,263/30. **343,806**

Complete Accepted: Feb. 26, 1931.

COMPLETE SPECIFICATION.

Improvement relating to Frangible Links for use in Fire Control Devices.

We, MATHER & PLATT LIMITED, a British Company, and ARTHUR ROBERTS, a British Subject, both of Park Works, Manchester, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to frangible links for use in fire control devices and adapted to break or rupture automatically on being subjected to a predetermined temperature.

The object of the present invention is to provide a link in which a frangible vessel of plain shape may be used. Another object is to provide separable members which can be arranged with respect to each other and with the frangible vessel so that the force imposed on the latter will be one of compression, albeit the separable members themselves are both pulled by the respective ties to which they are connected.

These objects are attained by providing separable members having parts which tend to move toward one another and by inserting between said parts a frangible vessel of simple bulb shape which, until destroyed, keeps the parts relatively stationary. Various embodiments are shown in the drawings each illustrative of how the invention may be applied.

It is already known in connection with the operation of automatic fire alarms and extinguishers and devices for the prevention of freezing of liquids, to use tubes of glass or other suitable material which are either in tension or acting under shear stress and adapted to break at a predetermined temperature so as to free a part of the apparatus.

In the accompanying drawings:—

Figures 1 and 2 are elevations, taken at right angles to one another, of a link constructed in accordance with the present invention.

Figures 3 and 4 are similar views of a modification:

Figures 5 and 6 show still another modification; and

Figures 7, 9 and 8 are a plan, side view and elevation in section on line 9—9 of

Figure 9 respectively of another modification.

Figure 10 shows a further modified form of Link.

Referring particularly to the drawings, the frangible link of Figures 1 and 2 has separable members *a* and *b*, each having an eye *c* at one end for engagement with force exerting ties (not shown). Near the other ends of these members and on the side of each opposite to the tie are suitable seats adapted to receive the drawn-out ends of a frangible vessel *d*.

This vessel is made preferably of fused quartz, glass or like frangible material, initially drawn in the form of a tube. It is then made into a bulb or vessel of the shape illustrated herein. The vessel is charged with a highly expansible fluid. Upon being heated to a predetermined temperature, the pressure exerted by the fluid will cause the vessel to be completely destroyed.

The above described charged vessel *d* is positioned with its ends resting in the seats in the separable members *a* and *b* and a clamp *e* is slipped over these members, a little beyond the vessel. Preferably this clamp has a fixed pointed, or knife-edge, jaw *f* which engages one member *b* and an adjustable knife edge *g* for engagement with the other member *a*. By suitable adjustment of *g* the two knife edges serve as fulcrum for the separable members: the eye ends *c* of the latter are subjected to the pull of the ties and the other ends exert a compressive force on the vessel *d*. When the latter is destroyed upon its fluid charge being heated to a predetermined degree, the separable members will be pulled away from the clamp *e* and from each other thus freeing whatever has been held in restraint by the link.

In Figures 3 and 4 there is shown one of the separable members formed as a rigid yoke *a* with the inner surfaces of its ends converging downward. The other separable member *b* is similarly yoke-shaped but its arms are pivoted at *h* and the outer surfaces of their ends *h'* are disposed so that they can be spread apart and placed within the ends of *a*. Inter-

mediate the pivot *h* and the surfaces *h*¹, each arm of the separable member *b* has seats adapted to receive the ends of the frangible vessel *d*, one arm having a seat *i* on a threaded stem *j* which is adjusted to impose pressure upon the arms and cause the parts *h*¹ to make holding contact with the ends of *a*. Upon the shattering of the vessel, the arms *b* collapse and the two members *a* and *b* separate.

Figures 5 and 6 disclose a link having separable members and adapted to be stamped from sheet metal. Each member comprises arms *a*, *a*¹ and *b*, *b*¹, respectively, joined together at one end by a grommet *k*. The opposite end of each arm is drawn cup-shaped as shown, and outstanding beside the cups of one pair of arms are ears *m*. In assembling this link, the cups of one member are placed within the cups of the other and the two pairs of cups are spread apart to receive the vessel *d*, there being suitable seats *n* provided for the ends of the vessel. Bolts *o* are inserted through holes in the ears *m* on the outer cup-shaped members and the cups and seats, clamped against the ends of the vessel *d*. Upon destruction of the latter, the pull on the arms being transmitted to the curved surfaces of the cupped ends, cause the latter to separate and thus free the separable members.

The link disclosed in Figures 7, 8 and 9 has a separable member *a* with an eye at one end and an offset cup-shaped portion *a*¹ at the other end. This portion is received in a similar portion of the separable member *b*. Extending away from opposite sides of *b* are the arms *b*² of a yoke which terminates in the neck *p*. This has a threaded bore to accommodate the stem *j* of the seat *i* for one end of the frangible vessel *d*. The vessel also rests on a seat *n* which in turn bears on a shoulder in the hollow of the cup-shaped portion of *a*. When the frangible vessel is destroyed by the action of its fluid contents, the cup-shaped portions slip out of one another and the separable members are set free.

In the construction shown in Figure 10, two scissors-shaped levers *b* and *b*¹ pivoted to one another at *h* form one of the separable members which is connected to the other member *a* by a pin *r* passing through the bifurcated end of *a* and between the jaws *s*, *t* of the levers *b*, *b*¹. The bulb or vessel *d* holds the latter apart and so confines the pin *r* within the jaws *s* and *t*. When, however, the bulb or vessel shatters, the pull exerted between the separable members draws the pin *r* out of the jaws as the levers *b* and *b*¹ can turn freely about their pivot *h*.

The advantages of the type of link described are many. The frangible member is entirely free from the dangers of corrosion and by suitable selection of metal, the separable member can also be made substantially free from this danger. The characteristics of the frangible vessel are permanent. There is no "cold flow", and the link can be depended upon to give way at a predetermined temperature no matter how long it has been exposed to the elements. In the arrangement of parts disclosed in this application, the frangible vessel is subjected only to a compressive force which it is most capable of resisting. Because of this, links constructed in accordance with this invention are capable of supporting loads far beyond the limits permitted with ordinary fusible links.

The frangible links have particular value for use in holding fire doors and like parts which are intended to close or move when fire occurs.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A frangible link for use in fire control devices comprising, in combination, members adapted to be connected to ties and separably connected to each other, and a frangible vessel arranged to resist compressively the tendency of said members to separate, said vessel containing expansible fluid adapted upon being heated to a predetermined degree to destroy said vessel and thereby permit said members to separate.

2. A frangible link for use in fire control devices, comprising, in combination, a separable member adapted to be connected to a tie and having a cup-shaped end, a second separable member adapted to be connected to a tie and having a portion adapted to be received in the cup-shaped end of the first member, and means maintaining said portion within said cup-shaped end thereby to prevent separation of the said members, said means comprising a frangible bulb or vessel arranged to resist compressively the tendency of said members to separate, said vessel containing expansible fluid adapted upon being heated to a predetermined degree to destroy said vessel and thereby permit said members to separate.

3. A frangible link for use in fire control devices, comprising two scissors-like levers pivoted together and with a bulb or vessel holding the levers apart at one end, and a member with a pin thereon passing between jaw-like portions of the other ends of said levers, said member and

one of said levers being adapted for connection to ties, the said vessel containing expansible fluid adapted upon being heated to a predetermined degree to destroy said vessel and thereby permit the said levers to turn freely about their pivot.

4. The improved frangible links, for use in fire control devices substantially as described and as illustrated.

Dated this 2nd day of April, 1930.

MARKS & CLERK.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1931.

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